WPS600

Hydraulic Pressure Transducer

User's Guide

This accessory complies with the following standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EC
- FCC Part 15
- Pressure Equipment Directive 97/23/EC Article 3.3

600 bar
60 MPa
8700 psi

DO187-3

1. Safety

Symbols appearing in this manual:

WARNING	WARNING statements identify conditions or practices that could result in injury or death.

CAUTION	CAUTION statements identify conditions or practices that could result in damage to this product or other property.

Symbols appearing on the product:

	Danger of personal injury or property damage. Refer to manual for details.

Safety notices

WARNING	Please review the following safety precautions to avoid injury and prevent damage to this transducer or any equipment that is connected to it.

HAZARDS OF HYDRAULIC SYSTEMS

Hydraulic systems contain several hazards:

- Ejection of hot oil, which can cause skin burns
- Pinhole leaks, which can inject oil through the skin, causing serious injury including loss of fingers and limbs
- Unsecured high-pressure hoses, which can move at high speed and with large forces, causing injuries
- Unsecured hydraulic machinery, which can move without warning, causing injury

DO connect safely

This transducer must only be connected using pressure hoses and connectors designed for high-pressure hydraulic testing. No responsibility is accepted for damage or injury caused by the use of unsuitable pressure hoses or connectors.

DO follow the equipment manufacturer's safety instructions

Read the equipment manufacturer's service instructions before starting work.

DO wear appropriate personal protective equipment

Wear appropriate personal protective equipment (PPE), including safety glasses, when working with pressurized fluids.

DO NOT use if you are not trained to work with hydraulic systems

Use of this transducer by unqualified persons may result in equipment damage or serious personal injury.

DO NOT exceed maximum working pressure

To avoid injury, do not use the transducer with pressures above 600 bar.

DO NOT exceed maximum temperature

The lithium polymer (LiPo) battery inside the transducer can be damaged by excessive heating. Do not store or operate the unit at temperatures above 60 °C (140 °F).

DO NOT operate without covers

To avoid equipment damage and personal injury, do not operate this transducer with the covers removed.

DO NOT operate in wet or damp conditions

To avoid incorrect readings and possible equipment damage, do not operate this transducer in wet or damp conditions or submerge it in liquid. The transducer is splash-resistant but not immersion-proof.

DO NOT operate in an explosive atmosphere

To avoid personal injury and fire hazard, do not operate this transducer in an explosive atmosphere.

DO NOT operate the transducer if damaged

If you suspect that the transducer is damaged, have it inspected by qualified service personnel. Do not attempt to dismantle or repair it yourself.

DO NOT use with damaged or modified pressure hoses

Use only pressure hoses that have been pressure-tested. Do not use them if they have been disassembled, modified or damaged.

DO NOT use in long-term or permanent installations

The WPS600 is intended for immediate diagnostic purposes only. It should not, for example, be connected to a vehicle as a monitoring system.

2. Introduction to the WPS600

The WPS600 diagnostic pressure transducer allows quick and accurate pressure analysis of hydraulic systems.

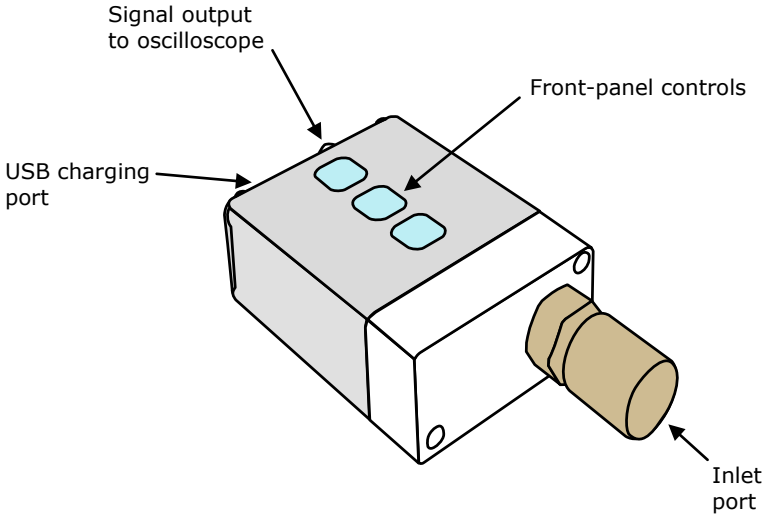
It offers these features:

- high resolution and accuracy
- zero adjustment
- two pressure ranges:
    - 600 bar / 60 MPa / 8700 psi
    - 60 bar / 6 MPa / 870 psi

Compatible fluid types

The WPS600 is designed for use with hydraulic fluids. Do not use with any other type of liquid or gas.

3. The parts of your WPS600 pressure transducer



Signal output	Use the BNC-to-BNC cable supplied to connect this to your oscilloscope. ! CAUTION This connector is made of plastic to ensure electrical safety. It could be damaged by a strong impact.
Front-panel controls	See Section 4.
USB charging port	For battery recharging only (no data connection). Connect to any USB port on a computer or wall charger.
Inlet port	Connect the pressure hose here.

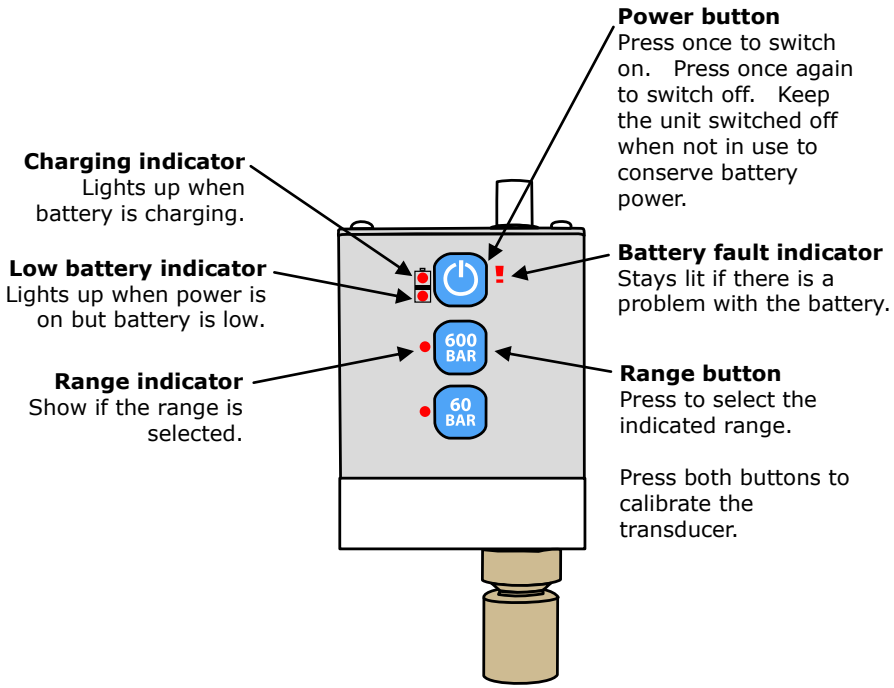
Re-ordering codes

If you need to re-order spare parts, please use the part numbers listed below.

WPS600 pressure transducer kit (PP746)

Part No	Qty	Description
TA092	1	WPS600 pressure transducer
TA081	1	USB to mini-USB charging cable
TA130	1	5 m insulated BNC to BNC cable
DO187	1	WPS600 manual
PA041	1	Carrying case

4. Front-panel controls


Power button
Press once to switch on. Press once again to switch off. Keep the unit switched off when not in use to conserve battery power.
Charging indicator
Lights up when battery is charging.
Low battery indicator
Lights up when power is on but battery is low.
Range indicator
Show if the range is selected.
Battery fault indicator
Stays lit if there is a problem with the battery.
600 BAR
60 BAR
Range button
Press to select the indicated range.
Press both buttons to calibrate the transducer.

5. Preparation for use

Before first use

- Remove all packaging.
- Charge the internal battery. For instructions, see Section 7: "Maintenance".

Zeroing the transducer

The WPS600 has a zeroing function to ensure its long-term accuracy. The transducer should be zeroed before first use, and can be zeroed again if the unit starts to show an error in the zero-pressure reading.

- Begin with the transducer switched off.
- If the transducer is connected to a pressurized system, make sure that the system is switched off and the pressure has been safely released.
- Disconnect any items that are connected to the transducer's inlet port.
- Switch the transducer on and check that one of the range LEDs is lit.
- Press both the "60 BAR" and "600 BAR" buttons at the same time, then release them. Both range LEDs will flash for a few seconds, and then the "600 BAR" LED will remain continuously lit.
- The transducer is now zeroed.

6. Using the WPS600

Preparing the transducer

- Ensure that the transducer's internal battery is charged.
- Unplug the charging cable from the transducer.
- Switch the transducer on.
- The "600 BAR" LED will light up to show that the unit is ready.

Measuring pressure

WARNING

ALWAYS safely depressurize the system under test before connecting the transducer. **DO NOT** connect the transducer to a system that is already pressurized.

WARNING

ALWAYS check that the pressure hose is securely fastened to the transducer **BEFORE** pressurizing the system. **ALWAYS** check for leaks when connecting the unit and **NEVER** leave it connected to a vehicle unattended.

- Connect the transducer to the hydraulic system, either directly or through a suitable high-pressure hose.

WARNING

Use **ONLY** pressure hoses specifically designed for high-pressure testing. Pico Technology cannot accept responsibility for damage or injury caused by the use of unsuitable pressure hoses or adaptors.

- Bleed any air out of the measurement chamber.
- Use the BNC cable supplied to connect the output of the transducer to the input channel of the oscilloscope.
- Switch on the computer and run the PicoScope software.
- In the PicoScope software, select the pressure sensor in the drop-down menu and then the appropriate pressure test.
- If necessary, press one of the Range buttons on the transducer to select the desired measuring range.
- Start the test using the appropriate procedure directed by the manufacturer of the machine being tested.
- A waveform showing the pressure of the system will appear on the PicoScope display.

Releasing the pressure in the measurement chamber

After a measurement, some pressurized fluid may remain in the measurement chamber. When disconnecting the pressure hose from the transducer, hold both items over a suitable container to catch the fluid expelled.

WARNING

DO NOT disconnect the transducer or the high-pressure hose from a pressurized system.

7. Maintenance

Cleaning the housing

Clean the transducer's housing by wiping it with a cloth moistened with clean water or water-based detergent. Allow the housing to dry before use.

- Do not use fuel or any other solvent
- Do not use abrasive cleaning agents
- Do not submerge the unit in any liquid
- Do not dismantle the unit
- Do not use the unit until it is perfectly dry.

Recharging the internal battery

- To charge using a computer, switch on the computer and allow it to boot. Disable any power-saving modes to ensure that the computer does not switch off before recharging is complete. Connect the transducer to the USB port of the computer using the USB charging cable provided.
- To charge using a USB wall charger, connect the transducer to the charger using the USB charging cable provided.
- Leave the transducer to charge for 5 hours.
- Unplug the USB cable from the transducer before use. Leaving the cable plugged in may affect measurement accuracy.

Repairs

If the unit is damaged or stops working, contact Pico Technology for repair instructions. Do not attempt to dismantle or repair the unit.

Disposal

The WPS600 contains a lithium polymer (LiPo) battery. When the transducer reaches the end of its life, take the entire unit to a battery recycling facility.

WARNING

YOU MUST observe the instructions below. Incorrect disposal of the battery could cause a fire or an explosion.

- Do not open the unit to remove the battery
- Do not crush or shred the unit
- Do not dispose of in fire

8. Specifications

Inlet		
Pressure ranges	0 to 600 bar 0 to 60 MPa 0 to 8700 psi	0 to 60 bar 0 to 6 MPa 0 to 870 psi
Connector	M16 hydraulic test port	
Output		
Scaling	1 V / 100 bar 1 V / 1450 psi 1 V / 10 MPa	1 V / 10 bar 1 V / 145 psi 1 V / 1 MPa
Offset (typical)	Manual zeroing	
Connector	BNC female, fits Pico Technology cable TA130	
Performance		
Accuracy	1% of scale	
Response time (10% to 90%)	100 µs	
Power supply		
Type	Built-in LiPo battery, not user-serviceable	
Charging current	500 mA (max.) at 4.75 V to 5.25 V from USB charger cable	
Charging connector	USB mini, fits Pico Technology cable TA081	
Ambient operating temperature	60 °C (140 °F) max.	
Ambient storage temperature	60 °C (140 °F) max.	
Environmental protection	Splash-resistant against water, gasoline, diesel and hydraulic fluids. Not immersion-proof.	
Weight	332 g (11.7 oz)	
Dimensions	132 x 64 x 31 mm (5.2 x 2.5 x 1.2 in)	

9. Conversion factors

The SI unit of pressure and vacuum is the pascal, symbol Pa. This is related to psi (pounds per square inch) and bar as follows:

- 1 bar = 100,000 Pa
- 1 psi = 6,894.757 Pa

10. Technical support

For assistance with operating this device, please contact Pico Technology at www.picotech.com.

Issue history:

1) 4.2.11 New product.
2) 11.8.11 600 bar on front page. PA041 added to parts list.
3) 24.11.11 All pressures in bar/MPa/psi.

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This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Manufactured in the United States

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